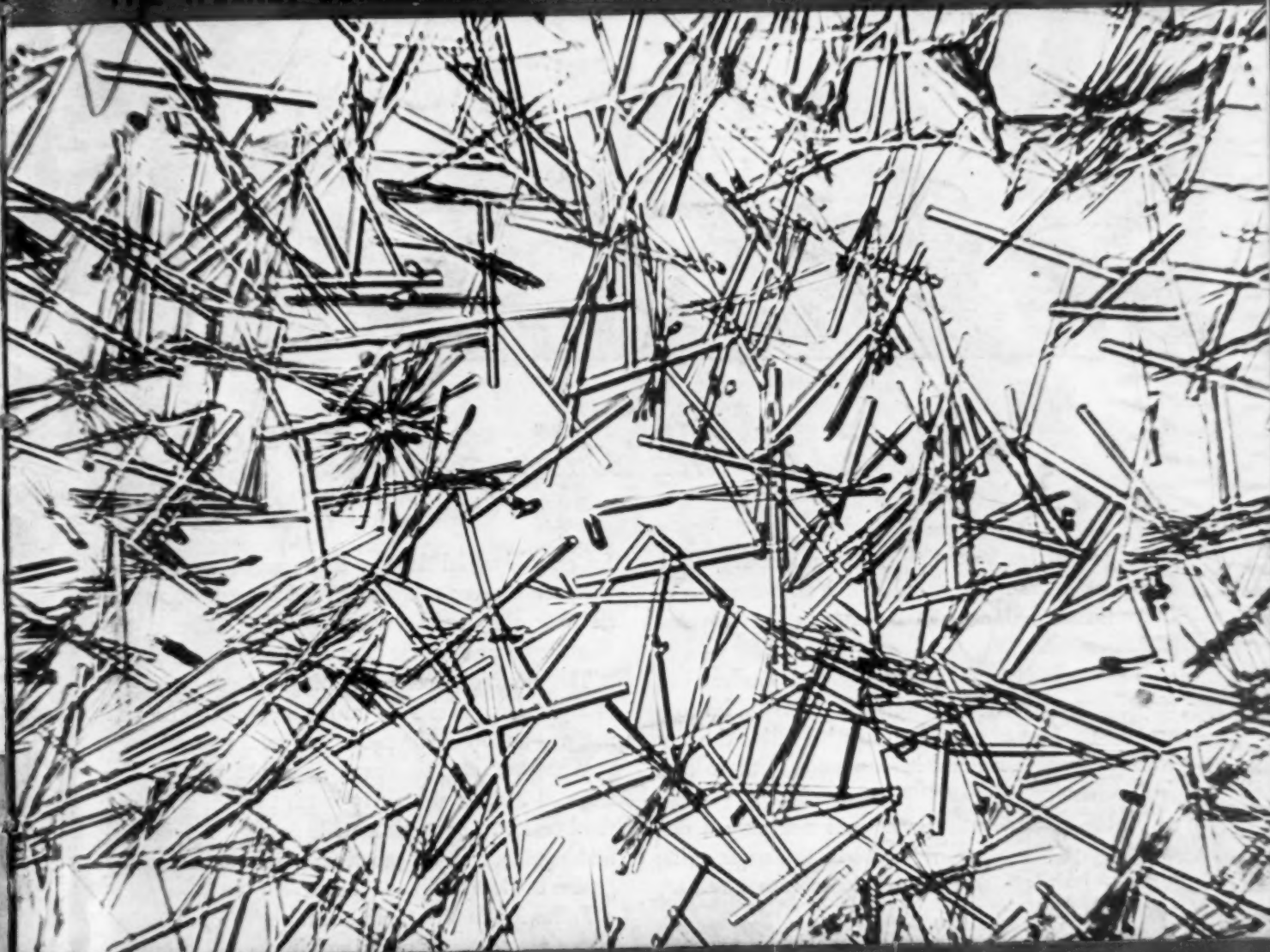


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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • JANUARY 19, 1946

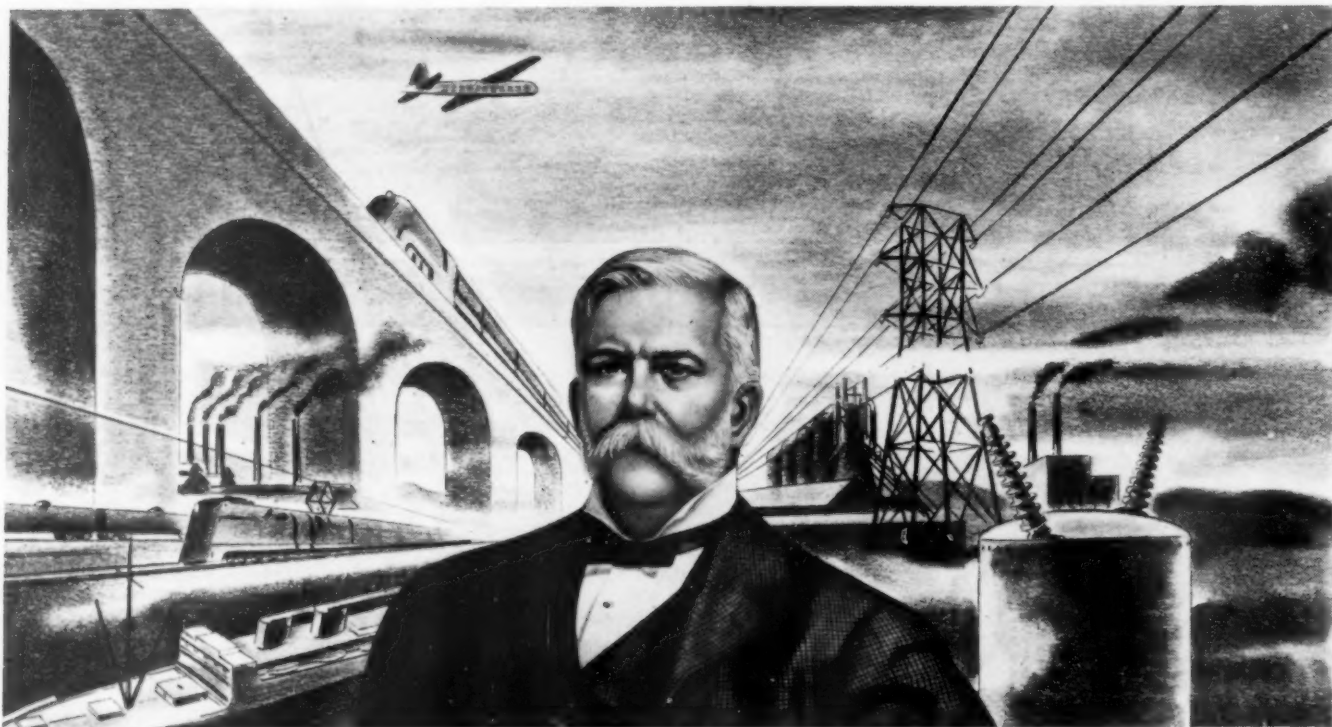


Death for Disease

See Page 39

A SCIENCE SERVICE PUBLICATION

GEORGE WESTINGHOUSE CENTENNIAL — 1846-1946



He was the "greatest living engineer"

This year we celebrate the 100th Anniversary of the birth of a man the world will long remember—known internationally in his time as the "*greatest living engineer*."

Early in life George Westinghouse showed marked inventive genius. When only 22 years old, he conceived the idea of the railway air brake . . . the first of many epoch-making inventions that made him world famous.

But George Westinghouse was not only a distinguished inventor—he also had the engineering "know how" to develop his ideas into *practical, workable form*.

For example, he pioneered in the development of the first practical alternating current system for long-distance transmission of electric power . . . the steam turbine for use on land and sea . . . the induction motor . . . railway electrification and automatic block signaling.

As an industrial leader, he founded many companies that were to bring untold benefits to people all over the world. The largest of these is the Westinghouse Electric Corporation.

The story of George Westinghouse is the story of a great engineer's vision in the growth of a new nation—and in the birth of a new era.

Wherever electric power is produced and distributed . . . or electricity is used in industry and the home . . . or world's trade moves . . . you will find equipment and practices stemming from the genius of George Westinghouse.

Following in the tradition, the men of Westinghouse are today pioneers and leaders in many industrial fields—electrical, mechanical, electronic, ceramic, plastic and metallurgical.

Westinghouse
PLANTS IN 25 CITIES OFFICES EVERYWHERE

CHEMISTRY

Vitamin A Synthesized

Kept secret during the war to avoid aiding the enemy, the process seems to promise independence of fish liver oils as source.

► VITAMIN A, hitherto obtained from fish liver oils, has now been made synthetically, Prof. Nicholas A. Milas, of the Massachusetts Institute of Technology, announced at a meeting of the American Chemical Society in Cambridge, Mass.

The synthesis was accomplished during the early part of the war but was kept a secret. War interference with the fishing industry caused a shortage of this vitamin, particularly important for growing children and necessary for eye health at all ages. To prevent wastage of the precious supply, the amount of the vitamin in multiple vitamin pills was restricted.

Now it appears that we were becoming independent of fish as a source of supply and need not worry over any future shortage of the natural vitamin.

Germany was also believed suffering from a shortage of this vitamin, in spite of the fact that she had access to some Norwegian fish liver oils. The acute shortage of vitamin A containing fats suffered by Germany and her allies during the first World War has been held responsible for the breakdown in morale that contributed to their defeat in 1918. These considerations led to keeping in-

formation about the synthesis of the vitamin secret for the duration.

Before the war, in 1937, one of Germany's leading organic chemists, Richard Kuhn, had announced a synthesis of vitamin A. Attempts by other scientists in Germany and other countries to synthesize the vitamin by his process, however, were entirely unsuccessful.

The M.I.T. workers investigated several processes before they succeeded in making the vitamin in the laboratory. The most successful process involves seven to eight chemical steps in which beta-ionone, ethyl chloroacetate, acetylene, and derivatives of beta-hydroxybutanone-2 are the principal raw materials used. Starting from beta-ionone the vitamin A active product is produced in an overall yield of 10-15%.

The biological potency of the product is only one-tenth to one-thirtieth that of pure vitamin A crystals obtained from natural sources, but is 50 to 100 times greater than that of ordinary cod liver oil.

The synthetic process has not yet been translated from the laboratory to commercial production but some preliminary cooperative work was done along these lines during the war.

Science News Letter, January 19, 1946

MEDICINE

Alkalis for Poisoning

Victims of wood alcohol poisoning saved from blindness and death by new treatment. Must be given promptly and repeated at hourly intervals.

► VICTIMS of poisoning by methyl alcohol, popularly known as wood alcohol and smoke, can be saved from blindness and death by alkali treatment, four Naval medical officers report. (*Journal, American Medical Association*, Jan. 12)

Good results with this treatment in 26 out of 31 cases were achieved by Comdr. W. B. Chew, Comdr. E. H. Berger, Capt. O. A. Brines and Capt. M. J. Capron. The other five died within three hours after being admitted to the hospital in a critically ill state.

One of those saved was unconscious for about 12 hours.

The men had drunk wood alcohol in amounts estimated at from about three ounces to about one pint. Many also had drunk beer ranging in amounts to 21 cans.

Washing out the stomach, giving fluids and purgatives has been the usual treatment. The profound acidosis present has prompted the use by some physicians of alkali treatment which the Navy doctors also found gave good results.



FUNGI TEST—Radar and radio equipment, switchboards, transformers and hundreds of other kinds of apparatus which went into the Pacific war theater in huge quantities were tested against attacks from every type of mold common to Pacific areas. Sixteen different kinds of fungi here receive their weekly meal of home-made bread to keep them robust and destructive. Photograph from Westinghouse.

The alkali is injected into the veins in the form of sodium lactate and given by mouth in the form of sodium bicarbonate. If the patient is unconscious, the sodium bicarbonate is given by stomach tube. The treatment must be given promptly and repeated, at about hourly intervals, three or four times until tests show the acidosis has been overcome.

Within a few hours the breathlessness, nausea, cramps and mental symptoms abated. Blurring of vision cleared within 24 hours in many cases. When discharged from the hospital, after about two weeks, all but four of the 26 had as good central vision as before the poisoning. Another two regained apparently normal vision within the next three months.

Science News Letter, January 19, 1946

CHEMISTRY

TDE Deadlier Than DDT For Mosquito Larvae

► TDE, a chemical compound related to DDT and sometimes found as an impurity in the commercial product,

proves to be even deadlier in its effects on mosquito larvae, state Dr. C. C. Deonier and H. A. Jones of the U. S. Department of Agriculture. (*Science*, Jan. 4.) They tried the material in several different media of dispersal as both dusts and sprays over the water, and found that its effects were more persistent after a given lapse of time. TDE is a convenience-designation, taken from the initials of the compound's generic

name, tetrachloro-diphenylethane.

The experimenters state in conclusion: "These laboratory tests are only preliminary, but TDE shows sufficient toxicity to warrant further study. Although early advice indicated that the compound might be difficult to manufacture, from more recent information it appears that TDE may be manufactured on a large scale."

Science News Letter, January 19, 1946

ELECTRONICS

Coaxial Cable Ready

Will transmit television pictures and sound between Washington and New York. Is one link in 6,000-mile national network planned.

► COAXIAL CABLE, now ready for the transmission of television pictures and sound between Washington and New York, is but one link in a national network of over 6,000 miles planned by the Bell System, and will be used both for television and telephone. Regularly scheduled intercity television service on this Washington-New York link will begin soon and will use the cable six nights each week. Coaxial cable transmission seems to be preferred in long-distance television at the present stage of development.

Television can be transmitted through the air by radio waves, but there are practical difficulties that must be met in long-distance transmission. Television images can be sent very short distances over special telephone wires, but not far because electrical losses are too great. The coaxial cable for long-distance television is a low-loss method of transmitting the broad band of frequencies which make up television signals. The probability is that all three methods will be used in interconnected systems.

One difficulty faced in the transmission of television images by radio waves, according to Walter Evans of the Westinghouse Electric Corporation is, that television waves travel in straight lines, and, for all practical purposes, stop at the horizon. This means, he says, that television broadcasts from the highest practicable tower erected on the ground cannot be received much more than 50 miles away.

By use of radio relay stations the television waves can of course be transmitted much farther. These relay towers are spaced about 30 miles apart. Such a tele-

vision relay system is now under construction for experimental purposes by the Bell System between New York and Boston, and another between Chicago and Milwaukee. The Bell System plans a television network that will consist of interconnected coaxial cable and radio channels.

Because of the difficulty of transmitting television images long distances from towers erected on the earth, the Westinghouse Electric Corporation recently announced plans to test out airborne relay stations in airplanes flying in lazy circles 30,000 feet above sea level. Waves sent out from transmitters in a plane at this height, it was explained, would blanket the earth's surface like a giant ice-cream cone, covering an area 422 miles across.

A coaxial cable, itself lead-covered, contains usually from six to eight conductors. Each is a copper tube about the size of a lead pencil, with a heavy copper wire extending throughout its length and held in its center, out of contact with the tube, by plastic disks. Each tube, with associated equipment, can accommodate a television channel, or 480 telephone channels.

Science News Letter, January 19, 1946

CHEMISTRY

Waste Sulfite Liquor Put to Useful Service

► ONE OF INDUSTRY'S worst waste-and-pollution problems, disposal of sulfite liquor from paper and wood-pulp mills, is attacked from a new angle by Richard G. Tyler of Seattle, who has been granted patent 2,392,435 on the

process he has worked out. Instead of trying to reduce the volume of the lime sulfite solution directly by evaporation, and thereby running into scale-formation trouble, he puts the spent liquor through a carbonaceous base-exchanger which has previously been treated with a solution of common salt—sea water will do.

The solution comes out as a complex mixture of sodium salts, containing lignin and other residues of the wood. After evaporation this can be burned under the boilers, supplying power. The clinker or "smelt" that is left is rich in commercially valuable sodium salts.

Science News Letter, January 19, 1946

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MEDICINE

Flu Research Was "Blind"

Biological warfare research team worked behind camouflage of much publicized studies on influenza. Defense developed against "centuries old killer."

▶ WAS PNEUMONIC plague one of the diseases our military authorities expected the enemy to use against us along with V-bombs and other more conventional weapons of war?

The Navy's report of its share in our biological warfare research suggests that it was, although in this as well as in the War Department's report no specific germ weapons are mentioned by name.

Working behind a "blind" of much publicized studies on influenza, a Navy medical research team at the University of California developed a "Man from Mars" protective suit and other defenses against germ warfare, it is now announced.

To this team, Naval Medical Research Unit No. 1, headed by Capt. Albert Paul Krueger, was given the mission of investigating "the possible use by an enemy of a certain infectious disease."

The name of the disease is not stated but it is described as "centuries old and one of the greatest of killers." Elsewhere in the report are references to airborne diseases.

Airborne diseases include such relatively harmless if unpleasant ailments as chickenpox and the common cold and such centuries-old killers as smallpox, diphtheria, pneumonia, anthrax and pneumonic plague. Against smallpox and diphtheria we have potent weapons of defense in vaccination, toxoid and antitoxin. Since the discovery of sulfanilamide, pneumonia has no longer rated as a great killer. That leaves anthrax, whose spores can be spread through the air, and pneumonic plague.

Pneumonic plague is caused by the same germs as bubonic plague. In the latter, the germs are spread by fleas from infected rats, ground squirrels and other rodents. The pneumonic form spreads directly from a plague patient whose breath carries germs from his infected lungs to the air.

Strengthening the idea that plague may have been the disease NAMRU No. 1 studied is the fact that its commanding officer is on military leave from his position as professor of bacteriology at the University of California at whose

Hooper Foundation studies of plague have long been going on.

Whether it was plague or some other disease, the Navy's research team escaped the killer it studied. No infections due to the organisms studied occurred among the investigators. Among the protective devices was an extensive modification of the apparatus devised for germ-free studies by Prof. J. A. Reyniers and associates at the University of Notre Dame. It consists essentially of a series of air-tight metal tanks fitted with sight and glove ports and built to contain all essential bacteriological equipment as well as experimental animals.

Before developing methods of defense against the disease, such as the "Man from Mars" suit for workers in prospective rescue or decontamination work, the Navy researchers investigated possible uses of the disease in offense. This in-

volved development of new techniques for growing highly infective germs in great quantity and for ultimately dispersing them in mists.

Besides the rubberized protective suit with its own oxygen supply, the Navy researchers tested special anti-bacterial masks and vaccines, antibiotics (remedies of the penicillin class) and sulfa drugs. Summing up the 33 months of hard and dangerous work, the Navy reports that:

1. Considerable knowledge has been gained in mass defense against possible enemy employment of a certain disease, which is highly fatal.

2. Laboratory and field data have been gathered which demonstrate that a man-made epidemic as an instrument of war is a likely possibility.

3. A protective suit, with self-contained oxygen supply, has been devised for the use of workers in any prospective rescue or decontamination operation.

4. Conclusive information has been obtained which would be of great value not only for protection from bacterial attack but for control of communicable airborne diseases among a peacetime population.

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DIRECT RECORDING—This portable electrocardiograph inks its record of heart action directly on paper without photographic darkroom procedures. The inventor, Paul Traugott, president of the Electro-Physical Laboratories, Inc., explained that his cardiotron can be used in the home by the physician if necessary.

ENGINEERING

Synthetic Lubricants

They contain no petroleum oils, are suitable for machinery and internal combustion engines, and are made from natural and other gases.

► NEW SYNTHETIC lubricants containing no petroleum oils, one suitable for use in machinery and in internal combustion engines, were described at the meeting of the Society of Automotive Engineers in Detroit. They are made from natural and other hydrocarbon gases, and are the result of 25 years of almost continuous research.

The report on the new lubricants was made by J. C. Kratzer of the Linde Air Products Company, D. H. Green of National Carbon Company, and D. B. Williams of Carbide and Carbon Chemicals Corporation. The development was conducted at the Mellon Institute of Industrial Research, Pittsburgh, and in industrial laboratories at Tonawanda, N. Y. and South Charleston, W. Va.

One of the new lubricants was described as the LB series, insoluble in water and adapted to lubrication of machinery, including internal combustion engines; the other as the 50-HB series, soluble in water and satisfactory for lubrication of metal, rubber and other materials.

Laboratory and road tests of automotive lubricants, known as LB-300 and LB-550, were said to show cleaner engine operation because of solvent action, easier starting at low temperatures, and smaller than normal deposits. Tests with military engines were reported to show that the synthetic lubricants assure greater freedom from sludge and varnish formation, better starting and operation in cold weather, and only slightly greater leakage.

The 50-HB series was described as being similar in properties to the LB, equal in lubricity, and completely soluble in water at room temperatures. They are satisfactory, the reporters stated, for use as brake fluids, cutting oils, and textile lubricants.

Outstanding advantage of both these series of new synthetics, they continued, is the possibility of exercising exact control, during manufacture, over viscosity and pour point. The oils are products of American science and industry; they differ chemically from German synthetics, and are said to be superior to them.

Rubber Supplies

Potential world production of 3,000,000 tons of rubber annually, or more than twice the estimated annual consumption, was characterized by President John L. Collyer of the B. F. Goodrich Company, as contributing to a complicated world surplus rubber problem which is a legacy of war.

Mr. Collyer recommended that, for purposes of national security, the American government accumulate a stockpile of natural rubber, and, further, maintain in operating condition plants capable of producing 600,000 to 700,000 tons of synthetic rubber annually.

Fuels for Diesels

► DIESEL engines can no longer be regarded as accommodating and tolerant consumers of petroleum oils which cannot be used for other purposes. The development of high-speed diesels has changed the situation; the diesel has become more selective in its diet, and is creating a demand for fuels having specific properties essential to efficient and prolonged operation.

This is the opinion of F. G. Shoemaker and H. M. Gadebusch of General Motors Corporation, stated at the same meeting. Experiments indicate, they said, that the type of service in which the diesel engine operates is the real criterion of its fuel requirements. Power developed by the diesel, they declared, appears to be directly proportional to the heating value of the fuel injected.

Highway Plans

► FUTURE plans for the development of two- to six-lane highways were revealed at the meeting by Herbert S. Fairbanks of the U. S. Public Roads Administration. He described the plans as visualizing city streets, main highways, and rural roads as elements of a nationwide system unaffected in its natural development by political boundaries and partitioned administrative authority.

The plans, he said, call for arterial through-ways instead of by-passes to serve

both intercity and local traffic, 224- to 300-foot rights-of-way, shoulders sufficiently wide to accommodate halted vehicles, and flat slopes on wide embankments for safety.

Lane widths, he explained, will be standardized at 12 feet, with two lanes on highways serving less than 2,000 vehicles daily, four lanes where traffic reaches 3,000 to 15,000 cars daily, and six lanes for heavier travel.

Rear-Engine Cars

► REAR-ENGINE passenger cars are a possibility by 1947, or whenever public demand develops. They will have the economy of small models and the roominess of large vehicles, William B. Stout of the Consolidated-Vultee Aircraft Corporation and the Graham-Paige Motors Corporation declared at the meeting.

Operation of an experimental car for 200,000 miles in eight years, he said, has demonstrated the practicality and advantages of rear-mounting of engines and of suspension that puts the vehicle's center of gravity below the level of support. He declared that rear-mounted engines make for better traction and easier steering, and permit of such better utilization of body space as to give large-car roominess to small vehicles.

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DENTISTRY

Fiberglas Used to Fill Root Canals of Teeth

► A SPECIAL form of radio-opaque Fiberglas yarn has been successfully used to fill root canals of teeth, Harry Maeth, D.D.S. reported, (*The Dental Digest*). Its use has several advantages, he said, among them the ability to verify stages of canal filling with the X-ray.

The material is easily handled, Dr. Maeth reports. It is worked into the canal from a piece about six inches long. Approximately 18 inches of yarn are required for the average-size canal. The automatic hand mallet, in addition to hand pressure, quickly forms the Fiberglas into a compact mass.

Other advantages of Fiberglas include great tensile strength and high dimensional stability. It is non-toxic, non-irritating, chemically stable and does not absorb water.

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The fantail pigeon, by selective breeding, has had the number of tail feathers increased from the normal 12 to 30 or sometimes even more.

MEDICINE

War Waged on Cancer

Scientists who aided military victory now turning to fight for victory over cancer which killed twice as many Americans as enemy did.

► THE SCIENTIFIC might of the nation which gave such aids to victory as radar, flame throwers and atomic bombs, is now being mobilized for a long range fight to victory over cancer.

This disease ranks as our Number One Enemy, Dr. Frank E. Adair, president of the American Cancer Society, declared at the society's annual dinner for the National Association of Science Writers, held in New York.

"Between Pearl Harbor and V-J Day cancer killed more than twice as many Americans as did the Germans and the Japs," he stated. "Unless we do something about it, 17,000,000 Americans now living will die of cancer. It is exceeded only by heart disease as a cause of death. Because it frequently means not only death but long and cruel suffering, it is the disease we dread most."

The nation spent \$2,000,000,000 on wartime research on the atomic bomb. The cancer society hopes the American public will contribute from \$3,000,000 to \$5,000,000 during 1946 for research for the war on cancer.

The National Research Council, chief adviser of the government on the organization of wartime research, is now acting in the same capacity to advise the cancer society on cancer war research. It has already recruited 90 of the nation's leading scientists to lay the battle plans and hopes to enlist in the fight men now being released from the armed forces, it was announced at the dinner meeting. Funds for fellowships for such workers will be provided, Dr. Cornelius P. Rhoads, director of Memorial Hospital and chairman of the committee on growth which will guide the over-all planning, stated.

Information and materials from atomic, chemical warfare and other war researches will, so far as military security permits, be made available to cancer research workers, it is hoped. Negotiations for this are now under way with the Secretary of War, Dr. Rhoads announced.

While coordination of the nation's scientific abilities and activities brought enormous and rapid advances, application of the same kind of coordinated attack on cancer has certain differences,

Dr. Lewis H. Weed, chairman of the committee of medical sciences of the National Research Council under which the committee on growth has been organized, pointed out.

"Wartime research was chiefly concerned with applying knowledge which had been previously discovered," he stated, "while problems like that of cancer require the discovery of new knowledge."

Even with our present knowledge, however, "upward of 5,000,000 persons now living in America can be saved from death by cancer if they learn the danger signals of this disease and the importance of seeking medical aid at first sign of trouble," Dr. Clarence C. Little, director of the Roscoe B. Jackson Memorial Laboratory of Bar Harbor, Maine, stated.

The scope of the new attack on cancer can be seen from the subjects planned

for study under a score of research panels. These include genetics, chemistry and biology of cells, the milk factor, viruses, botany, nutrition, enzymes, proteins, the endocrine glands, the blood and blood forming organs, physics, radiology and radioactive tracer substances.

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MEDICINE

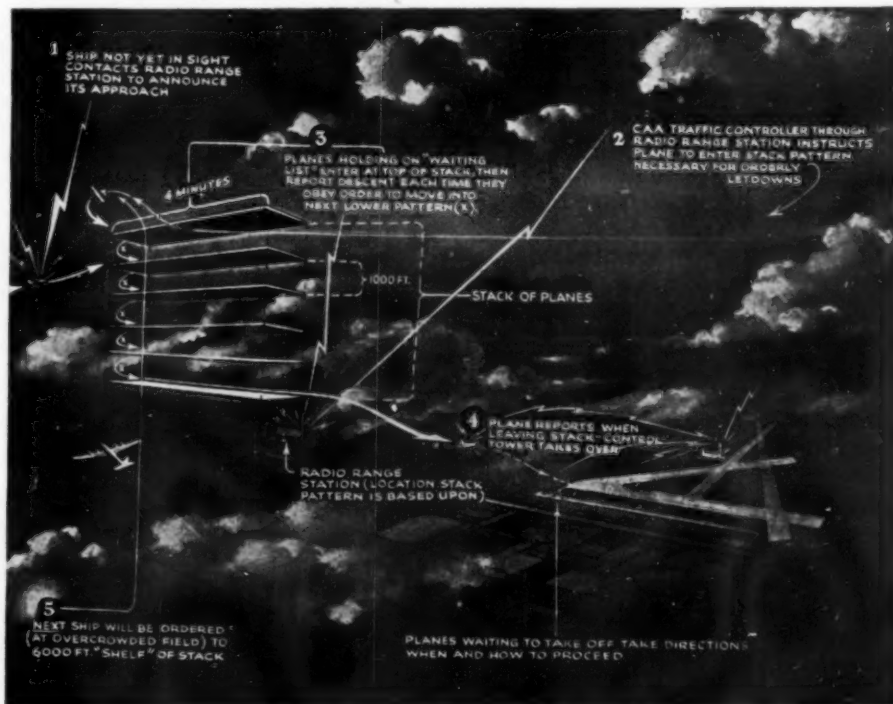
Penicillin Partner Fights T.B., Typhoid

See Front Cover

► CRYSTALLINE streptomycin, partner of penicillin, is shown on the front cover of this SCIENCE NEWS LETTER. Streptomycin proved effective in controlling tuberculosis in guinea pigs and has had limited suppressive effect on the disease in humans. The drug brought recovery from typhoid in three of five cases, suggesting it may bring recoveries and prevent carriers. Photograph from Merck & Co., Inc. (See SNL Sept. 29, Dec. 22).

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Dried eggs, developed for war uses, will probably be widely used in making ice cream in the future.



"STACKING" PLANES—The technique of "stacking" incoming airplanes at large commercial airports is illustrated by this drawing from the current "Bulletin of the Air Power League." Illustrative of the importance of airport traffic is the fact that some major airports are handling take-offs and landings at an average rate of about one every four minutes.

MEDICINE

Dozen Two-Headed Babies In Medical History

► **MEDICAL** history has recorded only about a dozen cases of babies born alive with two heads in the human family. Such anomalies are known technically as bi-cephalic monsters, and ancient legend relates stories of such cases.

Such strange births are probably the result of imperfect division of a single ovum or egg. Such accidents are supposedly related to the incidence of Siamese twins, though this theory is not completely established. Among cases recorded not one has ever lived more than a few hours.

The two-headed baby girl born in England recently lived only 50 hours. It is reported to have had two heads and two necks joined at a point on the shoulder. It had a single trunk. The two heads breathed independently and had different pulse rates, indicating the presence of two sets of lungs. Because the heads were fed separately, doctors believed it to possess two stomachs. One head was bigger than the other, and a little more active. Otherwise they were almost identical.

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MINERALOGY

Huge Vermiculite Deposit Discovered in Wyoming

► **A HUGE DEPOSIT**, amounting to several million tons, of a little-known but widely-used mineral ore, discovered near Encampment, Wyo., is now being mined and shipped. The ore is vermiculite, used in building insulation and as a replacement for sand in cement and plaster, and this deposit is thought to be the second largest yet opened in the United States.

Vermiculite is a non-metallic inorganic mineral with a more or less definite chemical composition that occurs in layers and somewhat resembles mica. It has a peculiar property of expansion upon heating, giving off water and spreading perpendicular to its layers, or plane of foliation, up to 16 times its first thickness. It then weighs only six to 10 pounds per cubic foot, and is said to be exfoliated. Exfoliation, carried out in a simple furnace, results in a material which contains millions of tiny air cells. This accounts for its insulation property.

The principal advantages of good vermiculite are that it is fireproof, insulating, vermin-proof and sound-dead-

ening, and has long life. When used as a loose fill or as an aggregate with cement or plaster, it provides an excellent fireproof insulation for roof decks and refrigeration plants, and can be used around hot pipes and furnaces.

When used to replace sand in cement and plaster, it has the added value of lightness; the expanded vermiculite weighs about one-tenth as much as sand. Vermiculite is mined in Montana, Colorado and North Carolina, as well as in Wyoming. The giant Wyoming deposit is being mined by the Alexite Engineering Company of Colorado Springs.

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BACTERIOLOGY

92-Year-Old Canned Food Found in Good Condition

► **CANNED FOOD**, still good although almost 100 years old, was found in a cache on Dealey island in the Arctic ocean north of Canadian Northwest Territory. It was stored there in 1852 by Captain H. Kellett of the English ship "Resolute" during his search for the Northwest Passage.

Eight of the cans of food were sent to the laboratories of the Department of Agriculture at Ottawa for chemical and bacteriological tests. Some of them contained stewed ox-cheek which was still wholesome, as was shown by feeding it to laboratory animals.

Other tests showed that there had been no bacteria in the still-intact cans, and that no chemical preservatives such as borates or nitrates had been used in the food. A can labeled "carrots," on the other hand, was badly corroded and its contents were not recognizable.

The discovery, states a publication of the British Tin Research Institute, was made in 1944 by the crew of a Canadian ship, under the command of Sub-Inspector Larson of the Royal Canadian Mounted Police. They journeyed from Vancouver to Nova Scotia and back by way of Bering Strait and the Northwest Passage.

Members of the crew made many landings during the two long winters when ice-bound in Arctic waters. They traveled hundreds of miles over ice by dog sleds. It was on one of these exploratory trips they found the cache, with some of the canned food intact. It is unlikely, the Institute says, that the cans remained frozen during the short summer seasons, therefore they were subjected to repeated freezings and thawings and to rusting in the moist air.

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IN SCIENCE

MEDICINE

Alkyl Sulfates May Be Stomach Ulcer Remedy

► **ALKYL SULFATES**, the chemicals used in so-called soapless soaps and shampoos, may provide a remedy for stomach ulcers, it appears from studies reported by Drs. Harry Shay, S. A. Komarov, H. Siple and Samuel S. Fels, of the Medical Research Laboratory of the Samuel S. Fels Fund in Philadelphia. (*Science*, Jan. 11).

The alkyl sulfates, the Philadelphia scientists discovered, act on stomach tissue to cause it to secrete mucus. A constantly renewed layer of mucus, it is now believed, is the chief protection of the stomach lining against the destructive action of gastric juice and consequent ulcer formation.

Besides stimulating production of this protective mucus layer, the alkyl sulfates can inactivate pepsin under certain conditions. They thus seem to have two-way action as potential stomach ulcer remedies.

The effect on mucus secretion lasts for several hours, but depends apparently on the alkyl sulfate being in direct contact with the stomach tissue. The use of the chemical, therefore, will depend on working out methods of giving it which will allow effective action.

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FORESTRY

DDT Saves Largest Tree In Pacific Northwest

► **DDT RECENTLY** saved a giant fir in Clatsop County, Oregon, believed to be the biggest tree in the Pacific Northwest, from destruction by loopers, which are swarming caterpillars that constitute one of the worst of timber pests. The forest giant has a diameter of more than 15 feet and is claimed to be more than a thousand years old.

Rescue of the huge fir was an incident in a general campaign to stop the ravages of the looper in Oregon softwood forests. DDT seems to have scored an outstanding success in this fight. Counts of dead loopers ran as high as 480 on six square feet of ground beneath the trees.

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ANCE FIELDS

AERONAUTICS

Jet-Propelled Plane For Carrier Operation

► A SPEEDY, fast-climbing, high-flying jet-propelled Navy fighting plane, designed for carrier operation, has been announced. It is the first Navy plane powered by jet engines and designed for use on carriers, and the first Navy fighter to attain a speed over 500 miles an hour. It will be known as the FD-1 Phantom.

Power for the Phantom is furnished by twin axial-flow Westinghouse turbo-jet engines built into the wing roots. The engines, which are of exclusive American design, contain no long scoops or ducts.

The plane is built of light aluminum alloy, polished to a glass-like finish, and presents only slight resistance to the air it passes through. It is a single-seat, low-wing monoplane with a wingspan of approximately 40 feet. Its wings fold electrically, and when stored the plane is but 16 feet wide.

The FD-1 has a service ceiling of well over seven miles, an extremely high rate of climb, and a range of approximately 1,000 miles. The plane has now been thoroughly flight-tested, and additional planes will be delivered soon. It was constructed by the McDonnell Aircraft Corporation of St. Louis.

Science News Letter, January 19, 1946

PHYSICS

Problems to Be Solved Before Atomic Application

► BEFORE atomic power finds wide applications, there is much development work to be done and many problems to solve, declared Dr. John R. Dunning of Columbia University at the meeting of the Society of Automotive Engineers in Detroit. But he forecasted the industrial utilization of atomic fuels and energy as future supplementary sources of power.

"It seems unlikely that atomic power ever will really replace our common fuels in most applications," he said, but "the new fuel is likely to be a supplement to existing methods. The immediate applications seem to be in the premium fuel field, where the special advantages of atomic power outweigh cost."

Cheaper methods of producing U-235

are in sight, he continued, and fissionable materials other than plutonium, some yet to be discovered, may accommodate large-scale production. Uranium, he said, is as abundant as copper, although uncommon in high-grade ores. Industrial applications do not require highly concentrated U-235, he commented, and materials outside the highly explosive range will serve. Burning low-grade materials by conversion with U-235, he continued, offers a promise of reducing atomic energy costs below those of coal.

Science News Letter, January 19, 1946

CHEMISTRY

Something Really New Added to Smoking Tobacco

► SOMETHING new really has been added to smoking tobacco—and smokers who have tried it have unanimously expressed a preference for it, even without the ritual of a blindfold test. For this simple addition of something that makes tobacco taste better when smoked, three chemists, Dr. C. F. Woodward, Dr. Abner Eisner and P. G. Haines, at the U. S. Department of Agriculture's regional laboratory at Philadelphia, have received U. S. patent 2,392,514.

Actually the "something new" has been in tobacco smoke all along, though it has never been found in tobacco itself. It is an alkaloid known as myosmine, which is said to be responsible for the pleasant aroma of cigar smoke, and which can now be produced synthetically.

The three chemists added microscopic quantities of myosmine to cigarettes, cigars and pipe tobacco, and then invited smokers to compare the treated smokes with similar ones that had no added myosmine. Without exception, the smokers liked the treated tobaccos better.

Rights for government use of this discovery have been assigned, royalty-free, to the Secretary of Agriculture.

Science News Letter, January 19, 1946

AGRICULTURE

High Buffalo Grass Sought By Agriculture Department

► BUFFALO grass that bears its seed high enough to be harvested readily is being sought by plant breeders of the U. S. Department of Agriculture. Progress is being made, they report, in developing a free-seeding strain needed to reseed areas where buffalo grass is the best grazing plant for the beef animals that succeeded the buffalo herds.

Science News Letter, January 19, 1946

AERONAUTICS

Cornell University Gets Aeronautical Laboratories

► THE AERONAUTICAL research laboratory and wind tunnel, in Buffalo, built and operated by the Curtiss-Wright Corporation, has been turned over to Cornell University and will be used for the training of graduate students, who will divide their time between the engineering school of the university proper and this laboratory. The Buffalo facilities will be supported by a number of leading Eastern aircraft manufacturers.

The laboratory, built in 1942, contains the most modern scientific equipment and testing devices known to aeronautical research. It includes also well-equipped chemistry, physics, hydraulic and electrical laboratories, a model shop and a technical library. Its wind tunnel, however, is its most outstanding equipment.

In this wind tunnel scale airplane models can be tested in air velocities in the speed-of-sound range, under varying pressure conditions. Also there are miniature wind tunnels where air travels at supersonic speeds, and one of the world's largest altitude chambers, where conditions of pressure, temperature and humidity up to 80,000 feet can be reproduced.

Dr. C. C. Furnas, who has headed the laboratory since 1943, will remain to direct its activities for Cornell.

Science News Letter, January 19, 1946

CHEMISTRY

Rubber Industry Gets Research Laboratories

► GROUND has been broken near Brecksville, Ohio, for new research laboratories for the B. F. Goodrich Company on a 260-acre tract of rolling land almost exactly halfway between Akron and Cleveland. Present plans call for five separate completely air-conditioned buildings made of gray brick. The groundbreaking was a part of the celebration observing the 75th anniversary of the founding of the company.

This building site was selected because of its freedom from dust, cross-country electric lines, vibration and noise. It will permit delicate operations that cannot be carried on close to industrial or manufacturing operations. The new plant will replace research laboratories in Akron, where the company's first laboratory was established in 1895.

Science News Letter, January 19, 1946

MEDICINE

Influenza Protection

Three out of four saved from influenza by vaccine made from virus grown on fertile hen eggs. It is effective against types A and B "flu."

By JANE STAFFORD

► TODAY, 27 years after the great influenza pandemic at the close of the first World War, medicine can do something about this disease.

To the old, never too popular advice—"Avoid crowds, keep yourself well fed and well rested to escape influenza"—can now be added, "See your doctor for a shot of vaccine that gives 75% protection against two types of the disease."

For the often-killing pneumonia and other infections that followed influenza in many of the 1918-19 cases, your doctor today can say, "It's only pneumonia," or "Only a strep infection," and get you on your feet again in a short time with a course of sulfa drug or penicillin treatment.

The vaccine, getting its first big test in the 1945-46 epidemic, might not have done any good in 1918 even if it had been developed. It is made from and effective against two types of influenza virus, A and B. What type caused the 1918 pandemic is not known. At that time some scientists thought the cause was a virus but others believed it was one of a number of slightly larger germs, bacteria, among them one called *Hemophilus influenzae*.

"Types" Discovered

More than a decade ago, however, Drs. W. Smith, C. H. Andrewes and P. Laidlaw, of the English National Institute for Medical Research, discovered influenza A virus, one of the two against which a protective vaccine is now available. In 1940 two American scientists, Drs. T. P. Magill and Thomas Francis, Jr., independently discovered type B influenza virus, the other one against which the protective vaccine is effective.

Types A and B influenza viruses are believed to be the ones that cause epidemics of influenza such as have occurred every few years since 1918. Other types probably exist but have not yet been identified. Type A is thought to have caused the epidemics in the odd-numbered years since 1933. Type B occurred in the two even-numbered years,

1936 and 1940. It got off its even-year cycle, however, causing a number of outbreaks in Army camps in the spring of 1945 and a sizable nation-wide epidemic in the winter of 1945-46.

Efforts to develop a vaccine against influenza have been continuing ever since the discovery of the A virus in 1933. In that same year, Prof. E. W. Goodpasture and associates, Drs. G. J. Buddingh and A. M. Woodruff, of Vanderbilt University, announced they had successfully vaccinated 11 persons against smallpox with a vaccine made from smallpox virus grown on fertile hen eggs.

"Daddy" Vaccine

You may wonder what smallpox has to do with influenza. The smallpox vaccine, however, was in a way the Daddy of the new vaccines against influenza, typhus fever, yellow fever and Rocky Mountain spotted fever. Typhus, 'flu, yellow fever, and smallpox are caused by germs of the virus class.

Rocky Mountain spotted fever is caused by rickettsia, a different type of disease germ but one which is closer to the viruses than to the bacteria such as streptococci, staphylococci and diphtheria bacilli. Viruses, unlike the larger bacteria, cannot be cultivated outside of living susceptible cells. This makes the study of them and development of vaccines to protect against them much more difficult, since it requires the use of living animals instead of chemical culture media.

When Dr. Laidlaw and associates succeeded in isolating influenza A-virus, they immediately started to try to develop a vaccine from it. First they injected ferrets with influenza virus from human patients. Then virus-containing material from the ferrets was injected into horses. Blood serum from these hyperimmunized horses was then used as a vaccine for tests on laboratory mice. The vaccine did succeed in protecting the mice against influenza virus.

The discovery that viruses could be grown on the chick embryo in fertile hen eggs gave scientists a powerful

weapon for the war on virus diseases. As early as 1939 Prof. Goodpasture predicted that a vaccine for influenza and solution of other virus disease problems would come from this discovery. In fact, an Australian scientist, Dr. F. M. Burnet, had already taken the first steps in that direction.

He had cultivated influenza virus on successive chick embryos until it lost its disease-producing power to such an extent that it did not cause sickness when dropped into the nose. At the same time, it increased the level of the body's own flu-fighting forces, called antibodies, in about one-half of those tested.

Efforts to develop a satisfactory influenza vaccine, continued by many scientists over the years since 1933, culminated, in 1943, with trials by the Army's Commission on Influenza of a concentrated inactivated vaccine prepared from the virus of influenza types A and B.

About 12,500 men in nine groups of Army Specialized Training Program units stationed in different parts of the United States were the human guinea pigs for this trial. Half the men in each group were vaccinated, the other half remaining unvaccinated for comparison. When influenza broke out that year, the Army had a good opportunity to evaluate the protective value of the new vaccine. Whereas 2.22% of the vaccinated came down with 'flu, almost three times as many, 7.11%, of the unvaccinated had influenza. The vaccine was therefore judged to be 75% effective, and to reduce the severity of the illness in those who were not completely protected.

Vaccination Ordered

Memories of the frightful influenza toll in Army camps during the 1918 pandemic haunted the Army's medical department all through World War II. When outbreaks of influenza began occurring in Army camps in the spring of 1945, suggesting that a big epidemic might be brewing for the following fall and winter, it was decided to take no chances on an unprotected Army. Orders were given for vaccination of all Army personnel in October and November.

The results of this mass vaccination procedure may show whether all of us will be justified in getting vaccinated against 'flu each fall.



FLU FIGHTER—Here a laboratory technician removes the virus-laden fluids from partially incubated chick eggs by suction in the laboratories of Pitman-Moore Co. This firm and Sharp and Dohme, Lederle, Squibb, Lilly and Parke-Davis manufactured vaccine for the Army and are now producing it for civilian use.

Disinfecting the air in public buildings and even homes with ultraviolet light or with invisible mists of germ-killing chemicals may be added to vaccination as a means of protection against influenza. While going to the doctor for a "shot" of vaccine would be simpler, the air disinfection method has the advantage of giving protection against other diseases than influenza.

Still needed in the almost Thirty Years War against influenza is a chemical remedy like the sulfa drugs or an

antibiotic like penicillin for treatment of patients. If the virus of the 1918 pandemic is ever again loosed on the world, the present vaccine probably would not be effective. The vaccine is specific for only two known influenza viruses. Sulfa drugs and penicillin and streptomycin, on the other hand, are effective against various strains or types of streptococci. A remedy effective in one influenza virus type might therefore be expected to remedy infection with any type of 'flu virus.

Science News Letter, January 19, 1946

ELECTRONICS

Aerial Counterspies

Special electronically equipped aircraft known as Ferrets hunted out enemy secret radar installations for Allied jamming or destruction.

► SPECIAL AIRCRAFT, known as "Ferrets", packed full of electronic equipment, served during the war as aerial counterspies in ferreting out the enemy's most closely guarded radar secrets. Details of their equipment and activities were revealed by Headquarters, Air Technical Service Command.

Flying over enemy territory, these spe-

cial radar countermeasures laboratories sought out enemy radar stations and analyzed their signals to determine what radar devices could later be used to make them ineffective by jamming. In other cases, the sites of the enemy radar were located and later the installations were bombed out of existence. If enemy stations were difficult to reach, information

was obtained relative to their blind spots, so that Allied craft could approach enemy territory with lessened danger of detection.

The Ferret carried equipment which not only received and recorded enemy radar signals but analyzed them for rate, size and shape of pulse, determined their frequency, and established the geographic location of the radar. Some 15 different electronic devices were carried by them, included with their special equipment that weighed about a ton.

Twenty-three Ferrets were in use at the end of the war. The first saw duty in January, 1943, when it flew a mission in the Aleutians to locate Japanese radars and determine the zone of their coverage. Only one was located, and it was found that certain areas were protected from its beams. It was in these areas that future aerial raids made approaches to the islands, surprising the Japs every time.

Two other Ferrets, outfitted in the spring of 1943, were used in the Mediterranean area in preparation for the Sicilian invasion in July. Enemy radars were located and effectively jammed by countermeasures devices. This was the first time that jamming was used in a major military operation. The production of Ferrets followed rapidly the successes of these two and they played an important role in both the European and the Pacific war zones.

Science News Letter, January 19, 1946

PHYSICS

Electrical Computer Solves Equations

► AN ELECTRICAL method of solving some mathematical equations that is four to seven times faster than conventional methods was announced to the American Physical Society in Los Angeles by Dr. Clifford E. Berry of the Consolidated Engineering Corporation of Pasadena, Calif.

The new computer used for solving linear simultaneous equations consists of an electrical circuit containing pairs of potentiometers. As those who have studied advanced mathematics know, the usual method of solving such equations involve a laborious cut-and-try method of assuming values and solving for one unknown and then for others. In the electrical method of solving the equations, different voltages are used to perform the necessary operations, and the computer used does not introduce significant errors.

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Do You Know?

Hawaii held its *sugar* output at near normal levels during the war.

A railroad car *axle unit*, including the two attached wheels, weighs over a ton.

Dried herbs hold their flavor better if freed of stems and stored in air-tight containers.

A *jet engine* that burns wood, apparently compressed sawdust, is described in a captured German document, it is reported.

One species of *rattlesnake* in the jungles of the American tropics is apparently losing its rattle, as this structure is reduced in size and is frequently not sounded.

Pure manganese, produced electrolytically from low-grade domestic ores, has advantages as a substitute for low-carbon ferromanganese in making stainless steel, the U. S. Bureau of Mines says.

Food storage technicians from several countries of the Western Hemisphere are conducting experiments in Venezuela to fit methods developed in the United States for use in the warmer countries.

Perlite, a glassy volcanic rock common in the Southwest, expands up to ten times its volume when heated in a rotary kiln at 2,000 degrees Fahrenheit, forming a cheap, fire-resistant insulation material.

With increased American acreage in *soybeans*, the discovery of a brand-new soybean disease in Illinois is important; it is called brown stem rot because the interior of the lowest part of the stem is usually colored brown.

THE SCIENTIST IN ACTION by W. H. GEORGE
A SCIENTIFIC STUDY OF HIS METHODS

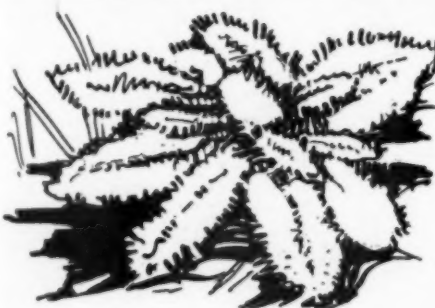
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Taking Cover

► SOME OF our commonest weeds learned long ago the first hard lesson that has to be taught to every recruit during his basic training.

After the rookie has learned the difference between his right foot and his left, and had it hammered into him that he *must* keep the muzzle of his rifle out of the dirt, he may be given his first run over a simulated-combat course. The first thing he learns there is that at the first rattle of fire from the other side he must take cover—flatten himself down like a horned toad, until he can hide behind a clump of grass no higher than a hat. If he learns well to keep the head down (not to mention other parts of his anatomy) he will stand a good chance of survival if he ever has to face the hazards of battle; otherwise, woe betide him!

A great group of plants, vastly diverse in botanical kinships, have learned the lesson of taking cover in the face of the deadly fusillades of snow and sleet and cold, drying wind that winter aims at any living thing that lingers out-of-doors when the really severe storms begin. These are the so-called rosette plants—dandelion, mullein, wild lettuce, thistle, harebell, ladies'-tobacco, saxifrage, hawkweed, and dozens of others—recognized as belonging to the same ecologic company by the way they flatten their symmetrical circles of leaves against the soil. They can make a breastworks of the lowest stubble, hide under a few dead leaves. They make an ally of the snow itself: as soon as it is a half-inch deep they are well protected against further assaults of cold and winter drought.

The great majority of rosette plants

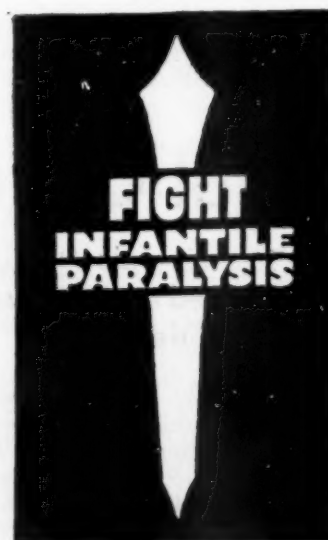
are classified as biennials or short-lived perennials. They get their start from seed during late spring or summer and by the end of the growing season they have their whorl of leaves well formed, close pressed against the ground, ready for what winter may bring. When spring comes and the snow melts off, they do not have to bother about unfolding leaves from buds or striking roots from seeds. There they are, leaves all ready for business, full of chlorophyll and displayed at maximum spread to catch the first warm rays of the sun.

Most rosette plants, when they are ready to convert the reserve stocks of food in their thick taproots into the structures and energy needed for seed formation, send up tall leafy stalks. Mullein, thistle, wild lettuce, hawkweed, all do this. Dandelion is more conservative; it utilizes a minimum of material in sending up its naked flower-scapes and keeps all its foliage well marshalled in a persistent rosette. And (to the woe of the greens committee and the lawn owner) it lives to fight another day.

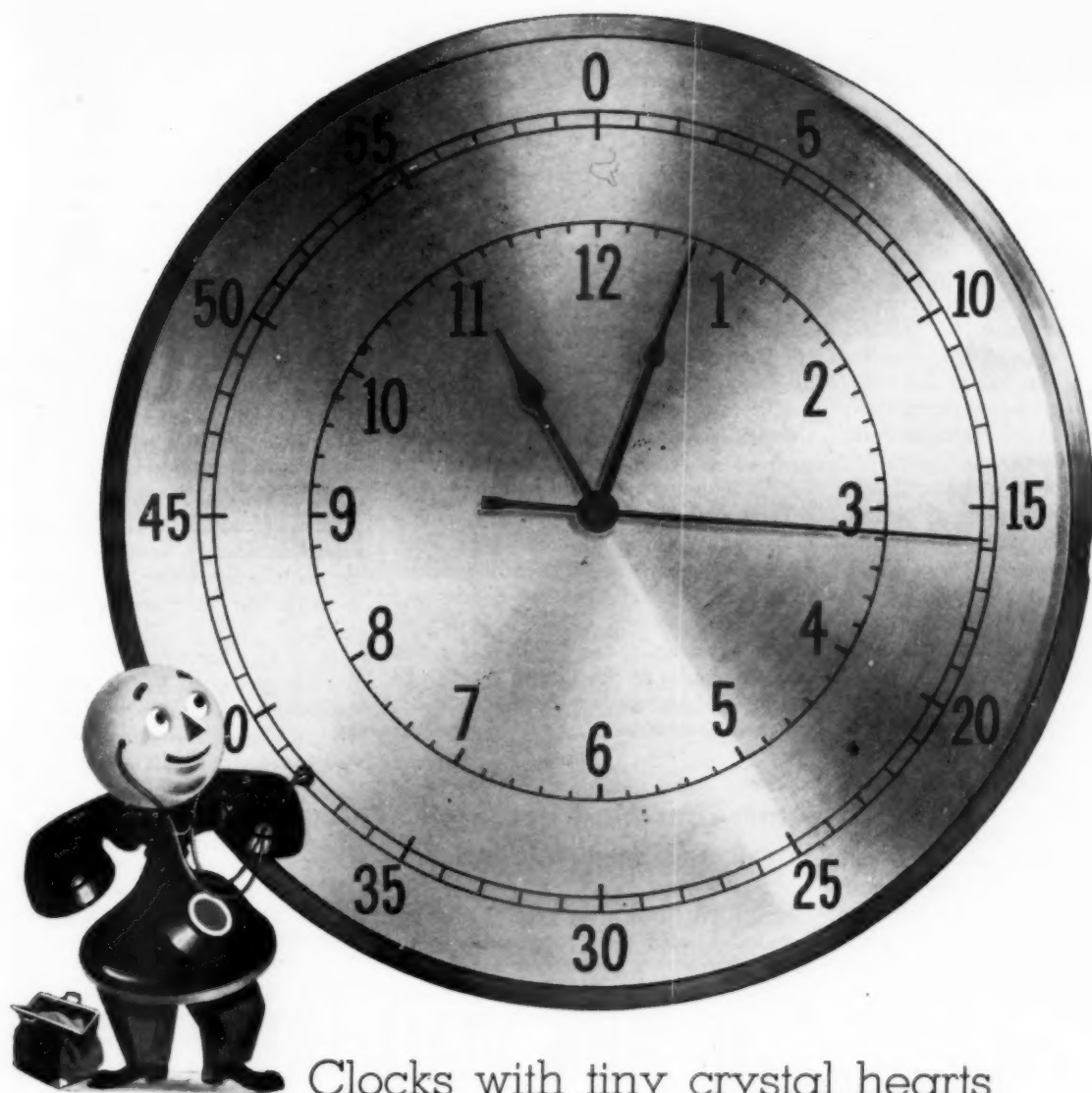
Science News Letter, January 19, 1946

If *leaf rust* destroys all wheat leaves at blossoming time the crop loss is approximately 34%, it is estimated.

Wood flour is finely ground sawdust; in addition to other uses it is employed as an absorbent in the manufacture of dynamite, permitting the explosive to be transported and handled with a minimum of danger.



MARCH OF DIMES
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Clocks with tiny crystal hearts that beat 100,000 times a second

CRYSTAL HEARTS beat time in Bell Telephone Laboratories, and serve as standards in its electronics research. Four crystal clocks, without pendulums or escapements, throb their successive cycles without varying by as much as a second a year.

Precise time measurements may seem a far cry from Bell System telephone research, but time is a measure of frequency, and frequency is the foundation of communication whether by land lines, cable, radio.

These clocks are electronic devices developed by Bell Laboratories, and refined over years of research. Their energy is supplied through vacuum tubes, but the accurate timing, the controlling heart of the clock, is provided by a quartz crystal plate about the size of a postage stamp.

These crystal plates vibrate 100,000 times a second, but their contraction and expansion is less than a hundred-thousandth of an inch. They are in sealed boxes to avoid any variation

in pressure, and their temperatures are controlled to a limit as small as a hundredth of a degree.

Bell Laboratories was one of the first to explore the possibilities of quartz in electrical communication, and its researches over many years enabled it to meet the need for precise crystals when war came. The same character of research is helping to bring ever better and more economical telephone service to the American people.



BELL TELEPHONE LABORATORIES *Exploring and inventing, devising and perfecting for continued improvements and economies in telephone service.*

GEOLOGY

Carolina "Bays" Dated

Studies of fossil bog pollen in the great elliptical depressions in the coastal plain indicate they originated during later phases of Ice Age.

► THE CAROLINAS' mysterious "bays", great elliptical depressions in the sandy coastal plain now mostly filled with bog deposits, originated during the later phases of the last great Ice Age, studies of fossil pollen carried on by Prof. Murray F. Buell of North Carolina State College indicate. (*Science*, Jan. 4)

Prof. Buell collected samples of soil from one of the bays, known as Jerome bog, taking them at six-inch intervals from the surface down through seven feet of peat and two feet of underlying clay, to the sandy soil at the bottom. Pollen grains preserved in the ancient soils were identified and counted.

Pollens from the lowermost samplings represented such trees as black-gum, native to the region today, indicating a climate not unlike that of the present when the depression was first formed. Above this, in the bottom clay, fir pollen is predominant, together with oak and hickory. This is the kind of forest now found in northern Minnesota, where the typical mixed hardwood forest of the United States meets the southernmost extension of the Canadian evergreen forest. Nearest firs to the "bays" now grow on the tops of the Southern Appalachians, with the mixed hardwoods stopping at lower levels.

It is estimated that a mixed hardwood-and-conifer forest must have developed in the Carolinas area during the Wisconsin period, which was the last great southward advance of the continental glaciers during the Pleistocene Ice Age.

The Carolina "bays", which have nothing

to do with bays in the ordinary sense of the word, have been the subject of much scientific controversy. One group of geologists believe they were produced by the impacts of giant meteorites in a single catastrophic shower. Opponents claim origins from less spectacular causes, such as eddying coastal currents, outbreaks of great artesian springs and the collapse of subterranean caves producing surface depressions and sink-holes. Prof. Buell points out that if the first hypothesis is correct, the Ice Age date determined for the Jerome bog should hold for all the bays; if not, the age is valid for this bog only; ages of others will need to be determined by separate studies.

Science News Letter, January 19, 1946

GEOLOGY

Americans Must Become Foreign-Mineral-Minded

► AMERICANS must become foreign-mineral-minded in the future and cooper-

ate with foreign government agencies in appraising foreign ore reserves that may some day be needed in the United States. This is the opinion of Dr. Alan M. Bateman, professor of economic geology at Yale University, expressed at a recent meeting of the Geological Society of America. He gave as a reason the problems faced during the war, of getting enough minerals to keep our industries in operation.

Dr. Bateman stated that he thought American mining companies should, with government cooperation, go into foreign mining of tin, manganese and chrome, in ventures that would afford protection to capital and benefits to the foreign countries.

He declared, "Without the security of return of capital, no capital will be invested in foreign ventures, and without the assurance of benefits to the owning country, no investments will be permitted."

It is Dr. Bateman's opinion that the State Department has an opportunity of leadership in establishing foreign relationships conducive to foreign mineral developments for Americans, and that geologists have a real job ahead of them for the future.

Science News Letter, January 19, 1946

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Books of the Week

ARTIFICIAL RESPIRATION EXPLAINED—Frank C. Eve—E. & S. Livingstone, 76 p., illus., 3s. New and improved methods of artificial respiration simply explained and fully illustrated.

AUTOMATIC WEAPONS OF THE WORLD—M. M. Johnson, Jr. and Charles T. Haven—Morrow, illus. and diagr., \$7.50. Describes military automatic arms that were used by both Axis and United Nations in World War II; early and experimental automatic weapons of all types from 1885 to 1945; and sporting automatic rifles, shotguns and pocket pistols in use up to the present time.

BETTER HEALTH FOR RURAL AMERICA; Plans of Action for Farm Communities—United States Dept. of Agriculture, Inter-bureau Committee of Post-War Programs, Government Printing Office, 34 p., illus., 20 cents. A survey of the facts about rural health and medical care, of what has been done in the past and what should be done now.

ELECTRONIC NAVIGATIONAL AIDS—U. S. Coast Guard—Government Printing Office, 48 p., illus. and diagr., free. Non-technical, summary information about Loran, Radar, and Racon as applied for commercial use.

GLYCERIN: Its Industrial and Commercial Applications—Georgia Leffingwell and Milton A. Lesser—Chemical Publishing Co., 259 p., diagrams, \$5. Will provide chemists, manufacturers, salesmen and industrial workers with useful hints as to the utilization of glycerin in their products and the formulation of new products.

GUIDANCE: Personal and Vocational—Lili Heimers and Margaret G. Cook, New Jersey State Teachers College, 40 p., 75 cents. A bibliography of charts and posters, films and filmstrips, pictures, publications, recordings and transcriptions for use in guidance in the schools.

HIGHER EDUCATION LOOKS AHEAD—Ernest V. Hollis and Ralph M. Flynt, Government Printing Office, 98 p., 20 cents. Compilation of reports from American Colleges and Universities on their postwar plans. U. S. Office of Education, Bull. 1945, No. 8.

NATIONAL SCIENCE FOUNDATION—Senate Committee on Military Affairs—29 p., free. Text of Senate Bill 1720, introduced by Senators Kilgore, Johnson, Pepper, Fulbright and Saltonstall, to promote the progress of science and secure national defense. Copies may be obtained by writing to Senator Kilgore.

NUTRITIVE PROPERTIES OF PORK PROTEIN AND ITS SUPPLEMENTAL VALUE FOR BREAD PROTEIN—U. S. Department of Agriculture—Government Printing Office, 12 p., tables, 5 cents. Report of experiments to determine the digestibility and growth-promoting values of the protein in different dehydrated roasted cuts of fresh pork.

THE PAN AMERICAN YEARBOOK 1945—Pan American Associates, 829 p., maps and illus., \$5. An economic handbook and ready reference directory of the western hemisphere, including a special industries section.

THE PSYCHOANALYTIC THEORY OF NEUROSES—Otto Fenichel, M. D., Norton, 703 p., \$7.50. Giving a comprehensive treatment of the psychoanalytic doctrines as well as the wealth of clinical data contained in the author's previous books.

SCIENCE LEGISLATION: Analytic Summary of Testimony—Senate Committee on Military Affairs, table, 138 p., free. An analysis of the testimony of 100 scientists and other experts given to the Subcommittee on War Mobilization of the Senate Committee on Military Affairs regarding the Kilgore and Magnuson bills providing for the promotion of science. Copies may be obtained by writing to Senator Kilgore.

TABLES OF FOOD COMPOSITION: In Terms of Eleven Nutrients—Bureau of Human Nutrition and Home Economics, U. S. Dept. of Agriculture—Government Printing Office, 30 p., tables, free. Gives average values for food energy, protein, fat, carbohydrate, three minerals, and the better known vitamins for foods most commonly used in the U. S. and some of the less common foods.

TELEVISION: The Eyes of Tomorrow—William C. Eddy—Prentice-Hall, 330 p., illus. and diagr., \$3.75. Up-to-date, non-technical account of television in all its aspects—from basic principles of operation to how to stage a full-scale broadcast.

CHEMISTRY

Phosphor Investigation Determines How They Work

► THE RAPIDLY growing use of fluorescent lamps, in which invisible rays are made over into visible light by the use of substances called phosphors, has led to intensive laboratory studies of what are good and what are bad phosphors, with satisfactory results announced. Dr. Rudolph Nagy, Westinghouse Lamp Division research chemist, is in charge of the study.

An efficient phosphor, he points out, is made up of molecules and atoms circled by electrons that whirl around it like tiny satellites. Atoms within each molecule resonate like a violin spring or a musical tuning-fork and are in constant vibration, he says.

"The frequency of resonance, which is the flow of energy back and forth throughout the crystal, determines the ability of the phosphor to absorb ultraviolet radiation inside the fluorescent lamp tube and to emit light in the desired part of the spectrum," he explained.

Conjugation, or pairing of the atoms within each molecule, is the only known method by which this resonance can occur over lengthy microscopic spaces within the crystal, he continued. Hence

only those substances qualified by proper natural resonating atomic structures are capable of being an efficient phosphor.

The best phosphors found to date, according to Dr. Nagy, are zinc beryllium silicate, magnesium tungstate, calcium tungstate and cadmium borate.

Science News Letter, January 19, 1946

ASTRONOMY

Meteorites Drawn to Electromagnetic Cane

► AMATEUR meteorite-hunters can be saved many a backache from stooping over unnecessarily by using an electromagnetic cane described by Dr. Lincoln La Paz, president of the Society for Research on Meteorites.

The cane consists of a small coil of enameled wire wound on a brass tube that can be slid up and down on a light, but strong iron rod. The electromagnet is connected to a battery carried in a knapsack. When connected with a six-volt battery, the cane readily picked up an Odessa iron meteorite weighing more than a pound, and caused "smaller fragments to jump an inch or more to the collecting tip," Dr. La Paz reports in *Popular Astronomy*.

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✿ **PORTABLE** barbecue for picnickers, the size of a suitcase when folded, is made of light, strong metal sheeting. When laid flat, the bottom, composed of two pieces, opens to form upright supports; the top, next to the grill, opens upward to shield the flame from wind.

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✿ **COMBINATION** plow to turn surface soil and loosen subsoil has additional small plows set a few inches below and behind the base of the regular or surface-turning implement. These crumble what farmers call the plowpan, or hard undersoil left untouched by the ordinary plow.

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✿ **ROTARY** knife, for cutting seed potatoes, after each cut passes through a bath of boiling water. The purpose of the sterilization is to control ring rot, a bacterial disease of potatoes often spread by a contaminated blade.

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✿ **ELECTRIC** fingernail file consists of a casing small enough to fit into the palm of the hand, in which is held a tiny electric motor with a grinding wheel on the forward end of the shaft. A depression and opening over the wheel lets the nail be placed against the revolving surface.

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✿ **GUNSIGHT** which projects an illusory but definite bull's-eye pattern into the sky around the target, is



mounted on a modern shotgun in the position shown in the picture. The hunter, in aiming, glances through the gunsight's reflector plate to see that the projected ring and dot are on the target.

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✿ **NOVELTY** savings bank has a frame for holding a photograph on its front side. Coins are slipped into the bank through a slot in the top behind the frame, through which, also, a special

hook may be inserted to raise a lever to open the bank.

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✿ **DRILL-SHARPENING** device is a simple stand that holds a drill in an upright position with its cutting edge slightly above the sloping top surface of the head of the stand. The slope is at the angle to which the cutting edge is to be sharpened, and guides the file or whetstone sharpener.

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✿ **FAN ATTACHMENT** for plows, recently patented, is claimed to keep the farmer cool while plowing. Fastened on the plow handles at its upper end it has a small rotary fan driven by a belt from a tractor wheel rolling on the ground under the handles.

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